

August 12, 1999

Defunct Keys and Odd Commands Still Bedevil Today's PC User

By JENNIFER 8. LEE

very time you sit down at a computer, you come into contact with an item that has been pretty much unchanged for 15 years: the keyboard. During that time -- an eon at today's technological pace -- mice have multiplied, monitors have grown and microprocessors have become exponentially more powerful. But like some awful new-wave band, the standard PC keyboard has remained mired in the early 1980's.

It has not remained that way because the design is optimal -- quite the contrary. Many designers criticize the keyboard for serving a befuddling mix of obsolete needs. Of the sprawling 101 keys on the standard keyboard, a good number are either redundant, confusing or vestigial.

While the Esc key often does escape, Pause seldom pauses. These days few people can articulate what SysRq is. At least Microsoft revived Print Scrn from the depths of obsolescence by using it for a screen-shot function in Windows. Perhaps one day Microsoft will find a scroll to lock for Scroll Lock.

"All these old buttons on the

KEY INFORMATION

PRINT SCRNR / SYSRQ

A carry-over from DOS, PrintScreen was given new life as a screen-shot function in Windows. System Request, from the mainframe era, is used in Linux but rarely anywhere else.

SCROLL LOCK

A key from early word processors, Scroll Lock apparently has one primary function now -- to operate the Scroll Lock light.

PAUSE/BREAK

Another mainframe relic, Pause now stops the operating system while a computer boots up. In DOS, Break stops a program.

ESC

A cancel command for mainframes, Escape is one of the few function keys to make a

THE NEW YORK TIMES
CLASSIFIEDS
NEW YORK TIMES

www.nytimes.com

ENTERTAINMENT

Restaurants
Movies
Music
Theater & Dance
Bars & Nightlife
Art & Museums
Books & Talks
Sports
Getaways

SHOPPING

Sales
Events
Coupons
Yellow Pages

CLASSIFIEDS

Real Estate
Autos
Jobs

COMMUNITY

About Community
Join a Group
Create a Group
Update a Group

LIFE

Food
Home
Fashion & Style
Health & Fitness
How to New York

NEIGHBORHOODS

Near My Home
Near My Work
Other Areas

THE NEW YORK TIMES
NEWYORKTODAY

ADVERTISEMENT

keyboard are literally the carrying over of the original sin," said Regis Magyar, one of the designers who worked on the standard keyboard design, which was introduced by the International Business Machines Corporation in 1984.

graceful transition to the modern keyboard.

NUM LOCK

Once used to toggle between number keys and functions, Number Lock is now used almost solely by video game players.

"We sort of need an exorcist to clean these keyboards out now."

The illogic doesn't stop there. The keys for the comma and the period, along with keys for opening and closing parentheses and brackets, are all next to each other, but the forward slash and the backward slash are two rows away from each other. And someone should explain why the Caps Lock light is often on the opposite end of the keyboard from the Caps Lock button.

Unfortunately, as engineers have realized over the years, renovating one of the most entrenched designs in computer history is nearly impossible. Few other items are used on a regular basis by as many people who have developed a skill set around it. And new keyboards must be compatible with a huge array of existing software, making the removal of keys difficult.

As a result, debates over keyboards are a little like debates over the Federal budget. Everybody wants spending cuts, as long as it doesn't affect them.

"People are always hesitant to take away a key, because it was there for some reason and you don't want to be the one to take it away and not have some application out there work anymore," said John Karidis, an engineer at I.B.M.

Keyboard users' habits and existing software have become obstacles to change.

The keyboard's entrenchment has become worldwide, conquering even nations that don't have primary languages based on the Roman alphabet. Japan and China, for example, have adapted to the standard keyboard, with many users finding it easier to type Romanized phonetic words on the 101-key keyboard and have the computer convert them into

Chinese and Japanese characters.

Keyboards constructed around the 50 Japanese "katakana" phonetic characters were too bulky compared with the standard Roman keyboards, said Izumi Kimura, a Japanese technology historian. Users showed a preference for the 101-key keyboard, with its smaller alphabet. "I personally think that the number of keys has been decisive," he said.

The standard keyboard design was arrived at in a relatively arbitrary manner, a combination of legacies and historical accidents that began with the patent of the so-called Qwerty typewriter in 1878.

The Qwerty layout, named for the first six letters of the top row, is the subject of much debate. The layout was designed by C. L. Sholes during the late 1860's so that typewriter hammers would not get caught on one another. A result, intended or not, was that it slowed down typists.

Even now, the layout is criticized for overworking the weaker ring and pinky fingers.

Related Article
A Keyboard Timeline
(August 12, 1999)

Alternative layouts emerged, most notably the Dvorak keyboard, which was patented in 1932 by August Dvorak and W. L. Dealey. But a number of studies have shown that it is only 6 percent to 10 percent faster than Qwerty, enough for a niche following but not enough for typists to throw out Qwerty and relearn touch-typing.

Qwerty has its proponents, too. Brian Shackel, professor emeritus of human sciences at Loughborough University in England, said that Qwerty is actually near optimal, primarily because it allows many keystrokes to be made by alternate hands.

As computer keyboards evolved from typewriters, extra keys were added to accommodate the proliferation of new functions. If the "hardware wars" between marketers, engineers and accountants had worked out differently at I.B.M., Dr. Magyar said, we all might be using vertical-only Enter keys and a half-size Backspace key.

"All these decisions were political and economic compromises," he said.

"The bean counters didn't care how much users liked it."

In spite of its flaws, the design inspired many copycats after it

was introduced. "Radio Shack said if the big boys did it, we'll do it," Dr. Magyar said. "Compaq said I.B.M. must be right. So everyone copied us."

Within a few years, the 101-key layout became the industry standard for PC's. Even Apple Macintoshes adopted similar keyboards, but with Command instead of Control keys and Option instead of Alt.

Many of the keyboard's quirks are left over from the time when engineers had to balance the needs of older mainframes and the emerging PC's. Keys like SysRq, Pause and Break are relics from the mainframe era. Ins, Del, Home, Page Up, End and the arrow keys were all introduced for editing functions to fill out forms on mainframes. Scroll Lock and Print Screen were developed for the DOS operating system. But as software and hardware has become more sophisticated, the keyboard has remained the same.

One of the great curiosities is the NumLock key, which allows users to toggle between number keys (which exist elsewhere on the keyboard) and arrow and utility keys in a single keypad area (which also exist elsewhere on the keyboard). In fact, the entire 17 keys of the number keypad make up a wholly redundant area of the keyboard.

"Everyone hates NumLock," said Dr. Magyar, who noted that the number keypad was created to accommodate spreadsheets. But even as the other utilities gained independent real estate, the redundancy remained to accommodate old software.

"NumLock is a dead key as far as I am concerned," Dr. Magyar said.

But one constituency remains faithful to the key. "NumLock is pretty valuable to players of many first-person games like Quake," said Dan Horn, a University of Michigan graduate student who has done research on keyboard designs, "because the number pad allows users to move diagonally more easily than the dedicated arrow buttons where two key presses are necessary."

Not all of the keyboard's design is arbitrary. The inverted-T format of the arrow keys was chosen for its efficiency. An analysis of typists by the Digital Equipment Corporation revealed that the most common switch between two keys was from the down-arrow key to the left-arrow key, so those keys were put next to each other, according to Michael Good, who worked on the project.

**Renovating one of
the computer's
most entrenched
designs has
proven nearly
impossible.**

"Back in the late 70's and early 80's, the arrow key functions were all over the keyboard," Good said.

"Wordstar had them as control keys on the regular keyboard. Other people had them on the numeric keypad.

They were arranged in squares and diamonds." Dr. Magyar

caught sight of Digital's inverted-T design in a computer magazine during the early 1980's, and adopted it for the I.B.M. keyboard.

As soon as I.B.M.'s standard keyboard emerged in 1984, competitors rushed to copy it. Some other keyboard designs were left trampled at the sidelines, including one developed at the Massachusetts Institute of Technology called Etude that included keys for many of today's commonly used functions like undo, cut, copy and paste. Though Macintosh computers originally had simpler keyboards when they were introduced in 1984, they soon offered extended keyboards that paralleled the PC 101-key model. But the relatively new Apple iMac has a streamlined keyboard.

"The iMac keyboard is hugely downsized, making people both happy and sad," Amelia Morrow, a longtime Macintosh owner, said.

Along the way, some additional keys have been introduced, most notably the three extra iconic keys -- two Windows keys and a menu key -- on Microsoft's Natural Keyboard, which have half-heartedly been accepted by users since their introduction in 1994. "It's hard to see why they bothered with the keys," said Richard Penn, who considers the Windows keys useless and redundant. "I think it came from a marketing goal to 'brand' the keyboard, rather than a usability goal."

Many of the design pressures affecting keyboards have to do with the shrinking size of personal devices like subnotebook computers. Typically, the number pad is the first to go, then the large keys get trimmed, then the entire keyboard is shrunk. One ingenious design was I.B.M.'s butterfly-concept keyboard on the Thinkpad, which is made up of two halves that fold up when the laptop is closed.

Another attempt to save space is the chordal keyboard, versions of which have appeared since the late 1980's. It has far fewer keys and takes up less space.

A chordal keyboard requires simultaneous key presses for each character typed, similar to playing a musical chord on a piano.

With as few as 5 keys, there are 31 chord combinations that may represent letters, numbers, words, commands or other strings. But they take a great deal more training, and are a lot less intuitive.

A number of companies have made one-handed Qwerty keyboards. One-handed keyboards were first developed in conjunction with the mouse.

Until voice-recognition or some other interface takes over, the keyboard will probably remain, and remain largely the same.

"Because novices are flocking to computers in droves to get on the Web, there is going to be more pressure to make computers as easy to use as possible," said Horn, who uses a Dvorak keyboard.

"People are comfortable with the current style of keyboard. Even if they are not good typists, they understand how the keyboard works, and can get by with hunt-and-peck strategies."

The New York Times <small>ON THE WEB</small> www.nytimes.com	26	Daily analysis for making informed investment decisions.
	24	
	22	

[Home](#) | [Site Index](#) | [Site Search](#) | [Forums](#) | [Archives](#) | [Marketplace](#)

[Quick News](#) | [Page One Plus](#) | [International](#) | [National/N.Y.](#) | [Business](#) |
[Technology](#) | [Science](#) | [Sports](#) | [Weather](#) | [Editorial](#) | [Op-Ed](#) | [Arts](#) | [Automobiles](#) |
[Books](#) | [Diversions](#) | [Job Market](#) | [Real Estate](#) | [Travel](#)

[Help/Feedback](#) | [Classifieds](#) | [Services](#) | [New York Today](#)

Copyright 1999 The New York Times Company

E